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EXAFS studies of the interaction of $Pu(VI)O_2^{2+}$ with goethite

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Abstract

The understanding of the migration and speciation of actinides in the geosphere is critical for the assessment and remediation of radionuclide contaminated sites. Sites contaminated with plutonium can pose both a chemical and radiological risk to surrounding populations and ecosystems. The molecular level interactions of plutonium with common soil components are necessary for a better chemical understanding of these systems. The sorption of $Pu(VI)O_2^{2+}$ on the iron oxide goethite was studied. Batch sorption experiments were performed at variable pH and at atmospheric carbonate concentrations. A variable-temperature extended x-ray absorption fine structure (EXAFS) spectroscopy study was conducted to identify the structure and oxidation state of the plutonium sorbed to the goethite surface at different pH and plutonium loading concentrations. EXAFS and sorption results are presented.

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